

SECTION 26 05 41
UNDERGROUND ELECTRICAL CONSTRUCTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the furnishing, installation, and connection of precast manholes and pullboxes with ducts to form a complete underground raceway system.
- B. "Duct" and "conduit," and "rigid metal conduit" and "rigid steel conduit" are used interchangeably in this specification.

1.2 RELATED WORK

- A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one section of Division 26.
- B. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
- C. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings and boxes for raceway systems.
- D. Section 31 20 00, EARTH MOVING: Trenching, backfill and compaction.

1.3 QUALITY ASSURANCE

- A. Refer to Paragraph, QUALIFICATIONS, in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
- B. Coordinate layout and installation of ducts, manholes, pullboxes, and pull-boxes with final arrangement of other utilities, site grading, and surface features, as determined in the field.

1.4 SUBMITTALS

- A. Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
- B. Shop Drawings:
 - 1. Clearly present sufficient information to determine compliance with drawings and specifications.
 - 2. Include manholes, pullboxes, duct materials, and hardware. Submit plan and elevation drawings, showing openings, pulling irons, cable supports, cover, ladder, sump, and other accessories and details.
 - 3. Proposed deviations from details on the drawings shall be clearly marked on the submittals. If it is necessary to locate manholes or pullboxes at locations other than shown on the drawings, show the

- proposed locations accurately on scaled site drawings, and submit four copies to the COTR for approval prior to construction.
- C. Certifications: Two weeks prior to the final inspection, submit four copies of the following certifications to the COTR:
1. Certification by the manufacturer that the materials conform to the requirements of the drawings and specifications.
 2. Certification by the contractor that the materials have been properly installed, connected, and tested.

1.5 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.
- B. American Concrete Institute (ACI):
- Building Code Requirements for Structural Concrete
318/318M-05.....Building Code Requirements for Structural
Concrete & Commentary
SP-66-04.....ACI Detailing Manual
- C. American National Standards Institute (ANSI):
- 77-07.....Underground Enclosure Integrity
- D. American Society for Testing and Materials (ASTM):
- C478-09.....Standard Specification for Precast Reinforced
Concrete Manhole Sections
C858-09.....Underground Precast Concrete Utility Structures
C990-09.....Standard Specification for Joints for Concrete
Pipe, Manholes and Precast Box Sections Using
Preformed Flexible Joint Sealants.
- E. Institute of Electrical and Electronic Engineers (IEEE):
- C2-07National Electrical Safety Code
- F. National Electrical Manufacturers Association (NEMA):
- TC 2-03.....Electrical Polyvinyl Chloride (PVC) Tubing And
Conduit
TC 3-2004.....PVC Fittings for Use With Rigid PVC Conduit And
Tubing
TC 6 & 8 2003.....PVC Plastic Utilities Duct For Underground
Installations
TC 9-2004.....Fittings For PVC Plastic Utilities Duct For
Underground Installation

G. National Fire Protection Association (NFPA):

70-11.....National Electrical Code (NEC)

H. Underwriters Laboratories, Inc. (UL):

6-07.....Electrical Rigid Metal Conduit-Steel

467-07.....Grounding and Bonding Equipment

651-05.....Schedule 40 and 80 Rigid PVC Conduit and
Fittings651A-00.....Type EB and A Rigid PVC Conduit and HDPE
Conduit

651B-07.....Continuous Length HDPE Conduit

I. U.S. General Services Administration (GSA):

A-A-60005-1998.....Frames, Covers, Gratings, Steps, Sump and Catch
Basin, Manhole**1.6 STORAGE**

Lift and support pre-cast concrete structures only at designated
lifting or supporting points.

PART 2 - PRODUCTS**2.1 PRE-CAST CONCRETE MANHOLES AND HARDWARE (NOT USED)****2.2 PULLBOXES**

A. General: Size as indicated on drawings. Provide pullboxes with
weatherproof, non-skid covers with recessed hook eyes, secured with
corrosion- and tamper-resistant hardware. Cover material shall be
identical to pullbox material. Covers shall have molded lettering,
ELECTRIC or SIGNAL as applicable. Pullboxes shall comply with the
requirements of ANSI/SCTE 77 Tier 8 loading. Provide pulling irons,
0.875 in [22 mm] diameter galvanized steel bar with exposed triangular-
shaped opening.

B. Polymer Concrete Pullboxes: Shall be molded of sand, aggregate, and
polymer resin, and reinforced with steel, fiberglass, or both. Pullbox
shall have open bottom.

2.3. DUCTS (NOT USED)**2.4 GROUNDING**

A. Rods: Per Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL
SYSTEMS.

B. Ground Wire: Stranded bare copper 6 AWG [16 mm²] minimum.

2.5 WARNING TAPE

Standard 4-mil polyethylene 3 in [76 mm] wide detectable tape, red with black letters, imprinted with "CAUTION - BURIED ELECTRIC CABLE BELOW" or similar.

2.6 PULL ROPE FOR SPARE DUCTS

Plastic with 200 lb [890 N] minimum tensile strength.

PART 3 - EXECUTION

3.1 MANHOLE AND PULLBOX INSTALLATION

- A. Assembly and installation shall follow the printed instructions and recommendations of the manufacturer. Install manholes and pullboxes level and plumb.
 - 1. Units shall be installed on a 12 in [300 mm] level bed of 90% compacted granular fill, well-graded from the 1 in [25 mm] sieve to the No. 4 sieve. Granular fill shall be compacted with a minimum of four passes with a plate compactor.
 - 2. Seal duct terminations so they are watertight.
- B. Access: Ensure the top of frames and covers are flush with finished grade.

3.2 TRENCHING

- A. Section 31 20 00 EARTH MOVING for trenching, backfilling, and compaction.
- B. Before performing trenching work at existing facilities, the Ground Penetrating Radar Survey shall be carefully performed by certified technician to reveal all existing underground ducts, conduits, cables, and other utility systems.
- C. Work with extreme care near existing ducts, conduits, cables, and other utilities to avoid damaging them.
- D. Cut the trenches neatly and uniformly.
- E. Conduits to be installed under existing paved areas and roads that cannot be disturbed shall be jacked into place. Conduits shall be heavy wall rigid steel.

- - - E N D - - -